



Research Update

► Summaries of current beef cattle research



► USGC releases study on low-oil DDGS at conference in Lethbridge, Alta., Canada. AJ Digital readers can click the photo above to access video, which is also available at www.youtube.com/watch?feature=player_embedded&v=Rv8NTff0TA

U.S. Grains Council Releases Study on Low-Oil DDGS

The U.S. ethanol industry continues to evolve, and many corn-based ethanol plants that send distillers' dried grains with solubles (DDGS) into the global market have installed corn oil extraction equipment. The extraction equipment removes a portion of the non-food-grade corn oil during the ethanol production process, making it available for other uses. However, this also changes the feeding characteristics and potential value of the DDGS, as regular DDGS may contain 10%-12% oil (fat), while the low-oil variety contains 6%-9% or less with more advanced processes.

Recognizing this growing change in ethanol industry practices and in response to questions in the marketplace, the U.S. Grains Council (USGC) commissioned a study in partnership with Agriculture and Agri-Food Canada to examine the use of low-oil DDGS in cattle diets. The study, which focused on low-oil DDGS as a substitute for barley in Canadian cattle rations, was recently released at a meeting in Lethbridge, Alta., Canada.

As expected, research results found that low-oil DDGS has a lower energy content than regular DDGS. However, low-oil DDGS has about the same energy content as barley when compared to barley-based cattle rations.

Low-oil DDGS also had no effect on cattle carcass quality, nor on overall production performance at common inclusion rates. In the feeding levels examined in the study, 20% low-

oil corn DDGS as a substitute for barley grain in finishing feedlot diets proved to be optimal.

The Council said the research was important in resolving uncertainty about the changing composition of DDGS and to help maintain transparency between U.S. DDGS exporters and importers. It also noted that communication between sellers, marketers, buyers and end users is important. Sellers and marketers must work together to understand the nutrient makeup of U.S. DDGS and inform buyers and nutritionists who need to know the type of product they are receiving in order to properly formulate rations and maximize animal performance. The value of the U.S. DDGS can then be properly assessed and agreed upon.

A copy of the study can be obtained from the USGC.

U.S. DDGS has proved to be a popular livestock and poultry feed ingredient in the United States and around the world. Roughly 40 million tons of the product is produced annually by corn-based ethanol plants, and 9 million to 10 million tons go into the export channel, an area that has seen rapid growth over the last five years as buyers from Canada to Taiwan learn more about it.

Sponsors of the study were the USGC and Agriculture and Agri-Food Canada. CHS, US Commodities and the North Dakota Corn Council sponsored speakers at the meeting in Lethbridge, while Gavilon sponsored a reception.

— Source: USGC

Effect of diet before calving

A group of 228 mature Angus-cross cows was fed one of three diets — high-fiber grass hay (HY), corn (CN) or dried corn distillers' grains (DG) — for approximately four months before calving. CN and DG were limit-fed at levels to equal total energy consumption of HY. After calving, cows were managed together on the same diet. After weaning, calves were backgrounded on stockpiled pasture for one month, placed on a finishing ration, and slaughtered weekly when individuals reached approximately 0.5 inch of fat cover.

Birth weight of HY calves averaged significantly lighter [6.3 pound (lb.)] than the average of CN and DG, which did not significantly differ. A significant difference in weight between HY and CN was maintained to weaning at 185 days of age (19.4 lb.) but not between HY and DG (4.0 lb.). There was no significant difference among the three diets in ribeye area or fat cover of calves at weaning, or sickness from birth to weaning or from weaning to slaughter.

There were no significant differences in finishing daily feed consumption, feed efficiency, average daily gain (ADG), slaughter weight, carcass weight, fat cover, ribeye area or USDA Yield Grade. HY were on feed longer to reach the targeted fat cover. HY dressed significantly higher (1.0%) than DG, with CN intermediate. HY had a significantly higher (43 units) marbling score and lower percent USDA Select (16%) than CN, with DG intermediate for both traits. There was no significant difference in tenderness.

The authors concluded that a high-starch precalving diet for dams might reduce intramuscular fat deposition and carcass quality grade of progeny after finishing.

— Source: Stephen Hammack
August Beef Cattle Browsing newsletter
Source: J. Animal Sci. 90:4962

Are organic foods healthier?

A recent study examined 17 human and 223 nutrient/contaminant research reports comparing organic and conventional food. In the three studies on humans where clinical symptoms were evaluated, there was no difference between organic and conventional sources in occurrence of symptoms such as wheezing and eczema.

Two of the 17 studies showed lower urinary pesticide levels in children consuming organic diets, but no difference of clinical significance in pesticide levels in serum, urine, breast milk or semen.

Nutrient levels did not differ, except that phosphorous was statistically higher, but not clinically significant, in organic sources.

Pesticide levels were statistically lower in organics, but differences were small and not at levels considered to be risky to health. *E. coli* levels did not differ. There was a slightly higher occurrence of antibiotic-resistant bacteria in conventional samples. The authors concluded that organic food is not more nutritious than conventional, but organics may slightly reduce exposure to pesticides and resistant bacteria.

— Source: *Stephen Hammack*
Beef Cattle Browsing newsletter
Annals of Internal Medicine 157:348;
Stanford Univ.

ARS Researchers Develop Strategies to Stop Tuberculosis Infections in Cattle

Improving tests and vaccination methods are some of the strategies USDA scientists are using to overcome obstacles that prevent the eradication of bovine tuberculosis

(TB) in cattle worldwide. Scientists at the Agricultural Research Service (ARS) National Animal Disease Center in Ames, Iowa, are developing new methods to prevent and control TB in cattle and white-tailed deer.

Veterinary medical officers Ray Waters and Mitch Palmer and microbiologist Tyler Thacker are collaborating with international groups, other U.S. government agencies, the cattle industry and private companies to combat TB. They are developing better tests to help producers identify and remove TB-infected cattle from herds and keep healthy animals.

The tuberculin cattle skin test has helped eradication efforts, but has drawbacks, such as a 72-hour waiting period for results, according to Waters. Interferon-gamma release tests require live white blood cells that must be processed quickly. Traditional serum tests would be more convenient and less expensive.

Scientists demonstrated that improved antigens — substances that cause the immune system to produce antibodies against foreign bacteria — are crucial in developing effective serum tests. These findings were instrumental in the recent development of a new serum TB test by

IDEXX Laboratories Inc. of Westbrook, Maine.

Another type of test, based on polymerase chain reaction (PCR) analysis of DNA, has been developed by Thacker. The new PCR test detects *Mycobacterium bovis*, the causative agent of bovine TB, in fresh tissues. It is quicker, accurate and helps distinguish between *M. bovis* and environmental mycobacteria, which can cause false-positive results.

Scientists also tested a century-old TB vaccine, *Bacillus Calmette-Guerin* (BCG), in deer. Palmer and his colleagues fed a BCG oral bait vaccine to captive deer and examined them one to 12 months later to determine how long the vaccine remained in the deer. BCG was not detected in deer given a standard dose.

Deer that received elevated dosages — 10 times the standard — had traces of BCG in lymph nodes and other tissues not commonly used for food. The vaccine was never found in common cuts of deer meat in any of the safety experiments.

Read more about this research in the September 2013 issue of *Agricultural Research* magazine available at www.ars.usda.gov/is/AR/archive/sep13/cattle0913.htm.



MU researchers study embryonic deaths to boost beef calf crop

Beef herd owners would be shocked to learn they'd lost 25% of cow pregnancies in two weeks. It happens all the time, and owners never know it.

"Huge losses occur before farmers know their cows are pregnant," says Mike Smith, University of Missouri (MU) animal scientist. "Many losses occur before the cows know they are pregnant."

Pregnancy checks in MU research herds show that three days after breeding, 95% of all cows bred are with calf. However, 14-16 days later, the percent pregnant drops to 70%. Early embryonic death loss cuts calf crops.

Late embryonic death pushes losses higher. By Day 30, pregnancy rates have dropped to 65%. Another 5%-10% can be lost later in gestation.

Preventing pregnancy losses offers profit potential to the beef industry. That research continues at the MU College of Agriculture, Food and Natural Resources.

New tools developed at MU allow early detection of pregnancies.

Smith, professor of beef reproduction, was to report his work at a field day Sept. 17 at the MU Thompson Farm, where he was to share with herd owners steps they can take to reduce embryonic losses.

"Genetic defects cause one-third of early losses. Those losses clear birth defects and genetic abnormalities," Smith says. "That leaves two-thirds of losses to stress and other factors in cows."

Herd managers can reduce stress.

"We don't know what causes all of these early embryonic losses," Smith says. "But there are ways to save more calves through management."

Transportation and heat stress cause losses. Loading cows on

a truck and moving them after breeding creates stress. Timing and method of moves affect loss rates. Heat stresses come from the sun and from toxic endophyte-infected fescue grass.

Smith studied embryonic death loss while earning his doctorate.

He did the research in the 1970s at the Texas Agricultural Experiment Station, Beeville, Texas.

Until recently, early pregnancy detection was difficult. New tools were developed by MU scientists in the Food for the 21st Century (F21C) program. They use hormonal assays to detect protein signals from the cow's placenta. Also, new high-resolution ultrasound monitors show early embryos.

"Earlier, we didn't have tools to do this basic work," Smith says.

Now, Smith returns to his studies in beef herds at Fort Keogh, Mont., MU Thompson Farm and in Brazil. Study of pregnancy loss requires large herds of cows to get significant results.

With fixed-time artificial insemination (FTAI), developed at the MU Thompson Farm, herd owners regularly achieve 65% of cows pregnant at Day 90 after breeding. With timed AI, all cows in a herd are bred on the first day of breeding season.

"When you get over 70% pregnant, that is phenomenal considering embryonic losses," Smith says.

Basic research on maternal hormones was sponsored by F21C, funded by the Missouri legislature. Smith's students aid in the research. Results are conveyed to farmers through field days and MU Extension.

MU received a five-year grant to study genetic defects affecting early embryonic losses in heifers.

— by Duane Dailey, MU Extension



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